



United States  
Department of  
Agriculture

Natural  
Resources  
Conservation  
Service

# Arizona

## Basin Outlook Report

### January 15, 2004



# **Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys**

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## ***How forecasts are made***

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation and streamflow values are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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# ARIZONA

## Water Supply Outlook Report

### as of January 15, 2004

A full range of Snow Survey and Water Supply Forecasting products is available on the Arizona NRCS Home Page:

#### Snow Survey Program

<http://www.az.nrcs.usda.gov/snow/index.html>

#### Helpful Internet Sites

#### Defending Against Drought – NRCS

<http://www.nrcs.usda.gov/feature/highlights/drought.html>

- Ideas on water, land, and crop management for you to consider while creating your drought plan.

#### Arizona Agri-Weekly

<http://www.nass.usda.gov/az/cur-agwk.pdf>

- Provides an overview of Arizona's crop, livestock, range and pasture conditions as reported by local staffs of the USDA's Agricultural Statistic Service and University of Arizona, College of Agriculture.

## SUMMARY

Dry conditions have had a significant impact on seasonal snowpack levels in Arizona, which range from 33% to 43% of average in key watersheds. As a result, surface water supplies will be short this season.

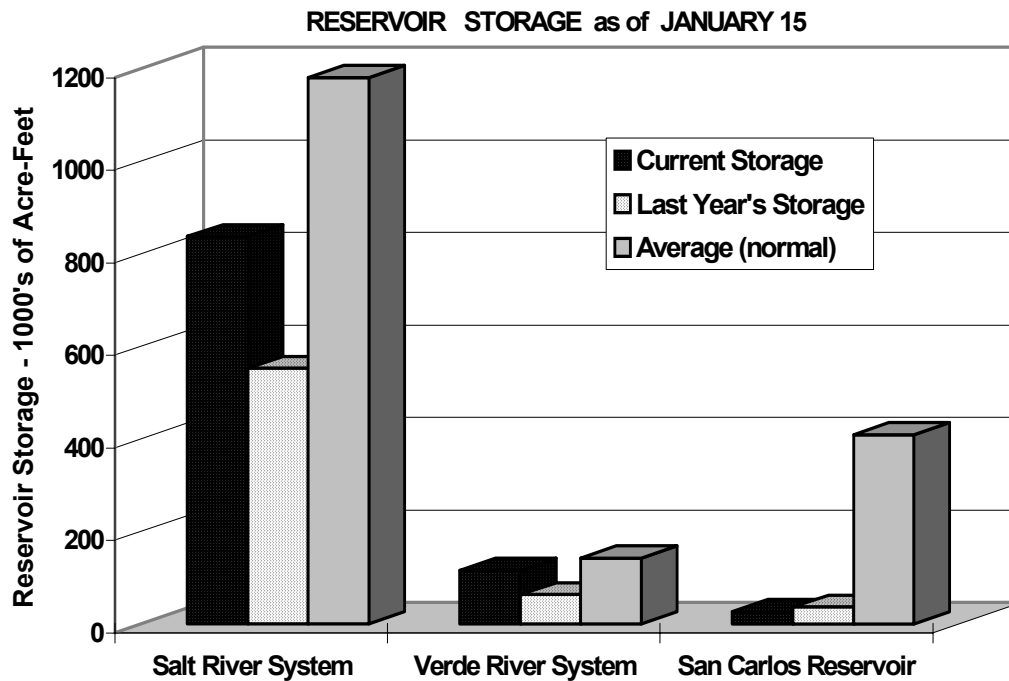
## SNOWPACK

Watershed	Percent (%) of 30-Yr. Average Snowpack Levels as of January 15, 2004
Salt River Basin	36%
Verde River Basin	43%
Little Colorado River Basin	35%
San Francisco-Upper Gila River Basin	33%
<b>Other Points of Interest</b>	
Chuska Mountains	68%
Central Mogollon Rim	40%
Grand Canyon	79%
San Francisco Peaks	58%
Statewide Snowpack	48%

## PRECIPITATION

Precipitation amounts were light for the period January 1-15. In that regard, precipitation catch for the month of January will be illustrated in the next report.

## RESERVOIR



Key storage volumes displayed in thousands of acre-feet (1000 x ):

RESERVOIR	CURRENT STORAGE	LAST YEAR STORAGE	30-YEAR AVERAGE
-----	-----	-----	-----
Salt River System	836.4	551.8	1181.3
Verde River System	114.8	63.0	141.7
San Carlos Reservoir	26.8	36.4	409.3
Lyman Lake	2.1	2.1	14.3
Show Low Lake	3.1	2.0	2.6
Lake Pleasant	487.6	386.5	----
Lake Havasu	510.5	554.9	557.4
Lake Mohave	1606.3	1684.7	1657.0
Lake Mead	15385.0	16802.0	21868.0
Lake Powell	11236.0	13530.0	18748.0

## STREAMFLOW

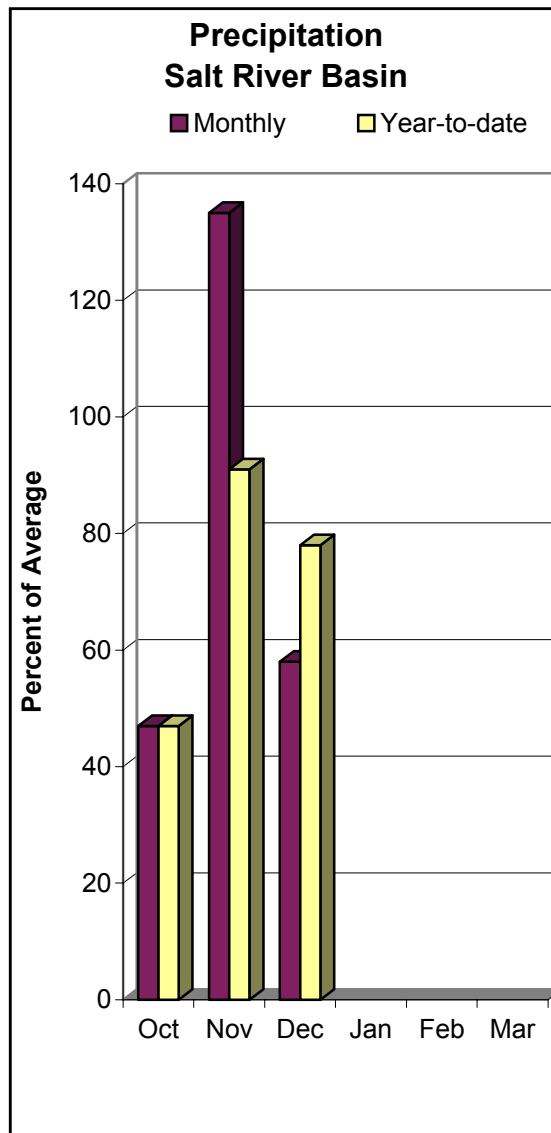
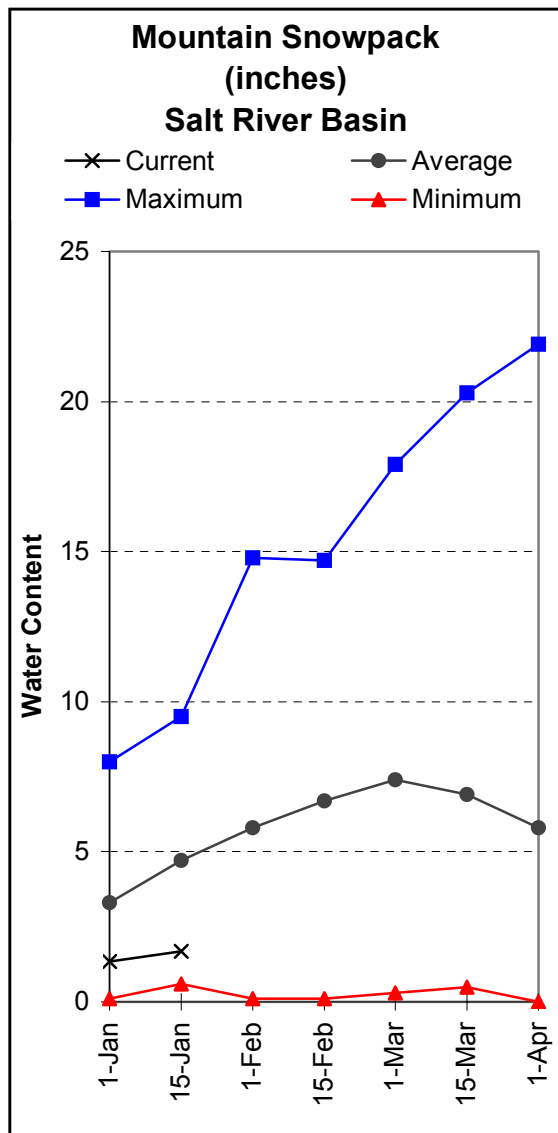
The runoff outlook through springtime remains poor as the result of low snowpack levels throughout the high country. Please refer to the basin forecast tables found in this report for more information.



## SALT RIVER BASIN as of January 15, 2004

Below median streamflow levels are forecast for the basin. In the Salt River, near Roosevelt, the forecast calls for 45 % of median streamflow levels through MAY, while in Tonto Creek, the forecast calls for 36 % of median streamflow levels through MAY.

Additionally, snow survey measurements show the Salt snowpack to be 36 % of the 30-year average, while combined reservoir storage for the Salt River system was reported at 836,441 acre-feet.



SALT RIVER BASIN  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Salt River nr Roosevelt							
JAN15-MAY	44	103	165	45	247	412	370
JANUARY	9.8	12.7	15.6	64	32	68	25
Tonto Creek ab Gun Creek nr Roosevelt							
JAN15-MAY	8.3	13.8	20	36	41	91	55
JANUARY	0.41	0.59	0.83	14	4.97	17.39	5.90

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

SALT RIVER BASIN  
Reservoir Storage (1000AF) Mid-January

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
SALT RIVER RES SYSTEM	2025.8	836.4	551.8	1181.3

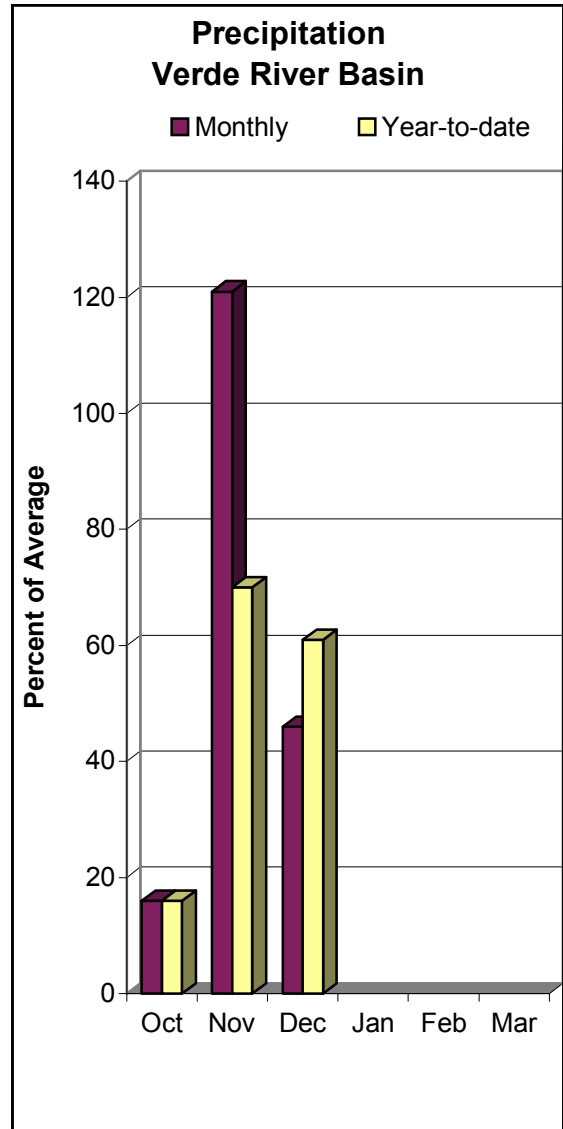
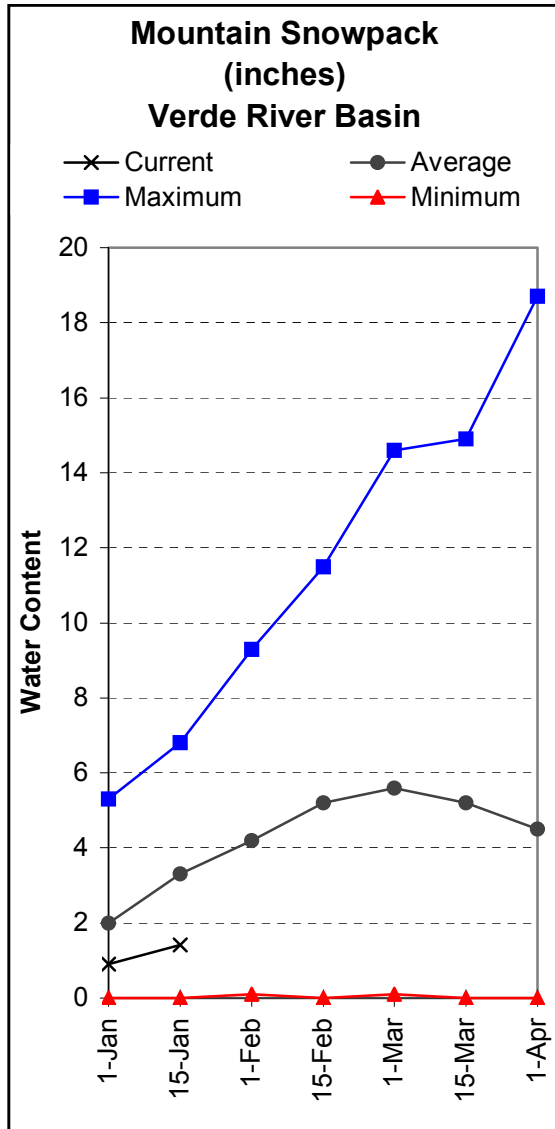
SALT RIVER BASIN  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
SALT RIVER BASIN	8	53	36

## VERDE RIVER BASIN as of January 15, 2004

Below median streamflow levels are forecast for the basin. In the Verde River, at Horseshoe Dam, the forecast calls for 52 % of median streamflow levels through MAY.

Additionally, snow survey measurements show the Verde snowpack to be 43 % of the 30-year average, while combined reservoir storage for the Verde River system was reported at 114,842 acre-feet.





VERDE RIVER BASIN  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Verde River abv Horseshoe Dam							
JAN15-MAY	25	66	110	52	171	296	210
JANUARY	8.4	10.8	18.0	75	31	61	24

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.

VERDE RIVER BASIN  
Reservoir Storage (1000AF) Mid-January

Reservoir	Usable Capacity	***** This Year	***** Usable Storage Last Year	***** Average
VERDE RIVER RES SYSTEM	287.4	114.8	63.0	141.7

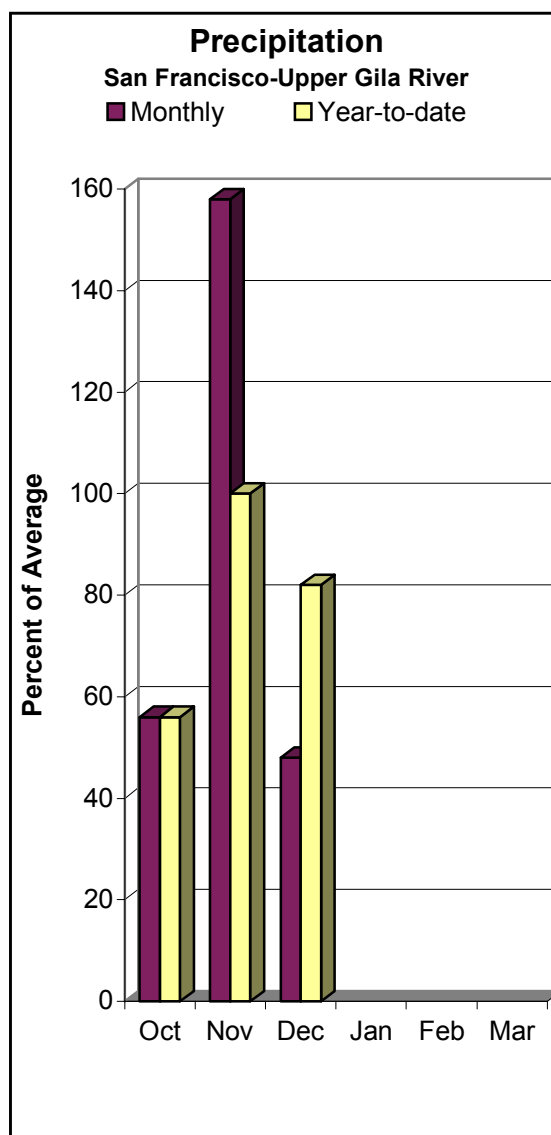
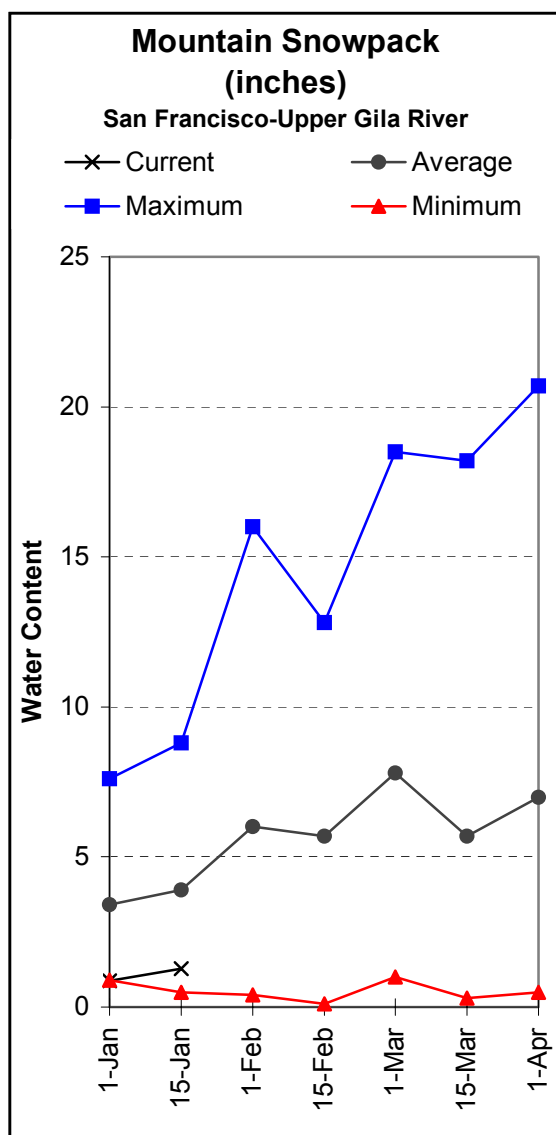
VERDE RIVER BASIN  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
VERDE RIVER BASIN	10	99	43
SAN FRANCISCO PEAKS	3	93	58

## SAN FRANCISCO-UPPER GILA RIVER BASIN as of January 15, 2004

Below median streamflow levels are forecast for the basin. In the San Francisco River, at Clifton, the forecast calls for 41 % of median streamflow levels through MAY, while in the Gila River, near Solomon, the forecast calls for 34 % of median streamflow levels through MAY. At San Carlos Reservoir, inflow into the lake is forecast at 32 % of median through MAY.

At San Carlos, reservoir storage stands at 26,839 acre-feet, while snow survey measurements show basin snowpack levels to be 33 % of the 30-year average.



SAN FRANCISCO - UPPER GILA RIVER BASIN  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Gila River at Gila							
JAN15-MAY	11.6	19.3	26	47	34	49	55
Gila River nr Virden							
JAN15-MAY	11.2	15.2	28	35	51	86	80
San Francisco River at Glenwood							
JAN15-MAY	5.2	7.8	10.0	39	14.2	22	26
San Francisco River at Clifton							
JAN15-MAY	11.2	18.5	27	41	52	88	66
Gila River nr Solomon							
JAN15-MAY	22	36	54	34	114	202	158
JANUARY			12.0	61			19.7
San Carlos Reservoir inflow							
JAN15-MAY	8.1	18.0	29	32	74	140	90

- \* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.  
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(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.  
(2) - The value is natural volume - actual volume may be affected by upstream water management.

SAN FRANCISCO - UPPER GILA RIVER BASIN  
Reservoir Storage (1000AF) Mid-January

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
SAN CARLOS	875.0	26.8	36.4	409.3
PAINTED ROCK DAM	2492.0	0.0	0.0	47.4

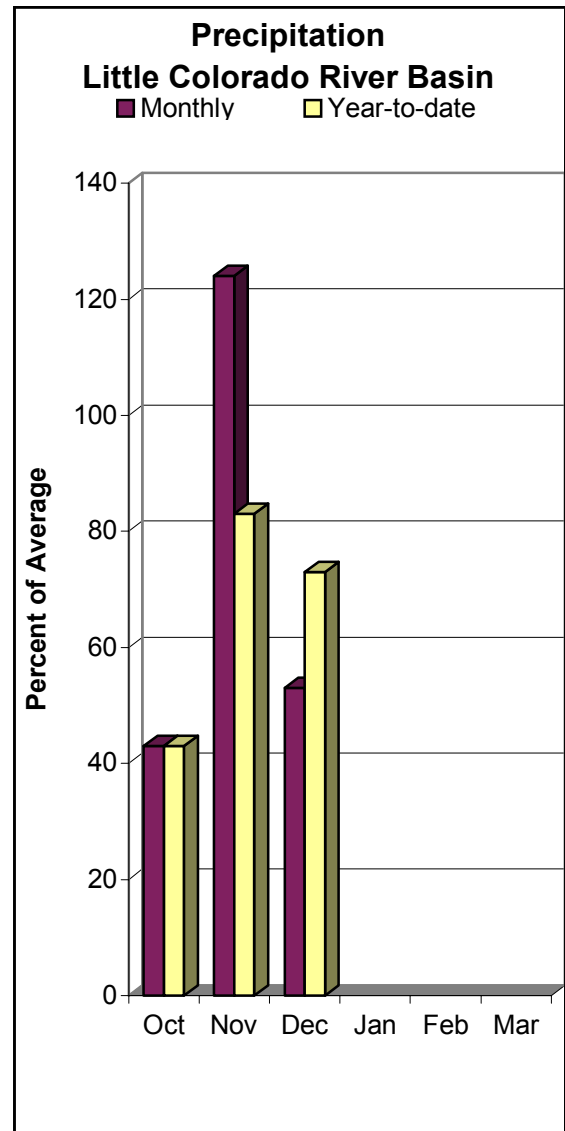
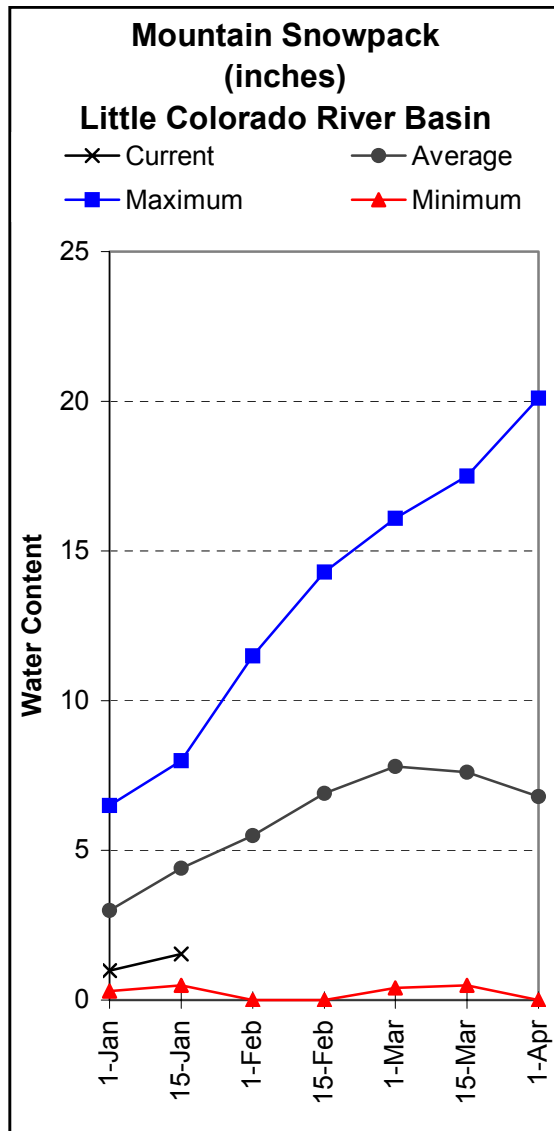
SAN FRANCISCO - UPPER GILA RIVER BASIN  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
SAN FRANCISCO - UPPER GILA R	9	51	33

## LITTLE COLORADO RIVER BASIN as of January 15, 2004

Below median streamflow levels are forecast for the basin. In the Little Colorado River, at Lyman Lake, the forecast calls for 31 % of median streamflow levels through JUNE.

Furthermore, snowpack levels along the southern headwaters of the Little Colorado River, and along the central Mogollon Rim, were measured at 35 % and 40 % of the 30-year average, respectively.



LITTLE COLORADO RIVER BASIN  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Med
Period	(1000AF)	(1000AF)	(1000AF) (% MED.)	(1000AF)	(1000AF)		(1000AF)
Little Colorado River abv Lyman Lake							
JAN-JUN	0.53	1.17	2.30	31	3.99	7.74	7.40
Little Colorado River at Woodruff							
JAN-MAY	0.25	0.54	0.84	23	2.30	3.70	3.60
Blue Ridge Reservoir inflow							
JAN-MAY	1.7	4.3	7.0	41	12.8	18.8	17.1
Lake Mary inflow							
JAN-MAY	0.50	1.04	1.75	35	2.72	4.73	5.00

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average and median are computed for the 1971-2000 base period.

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LITTLE COLORADO RIVER BASIN  
Reservoir Storage (1000AF) Mid-January

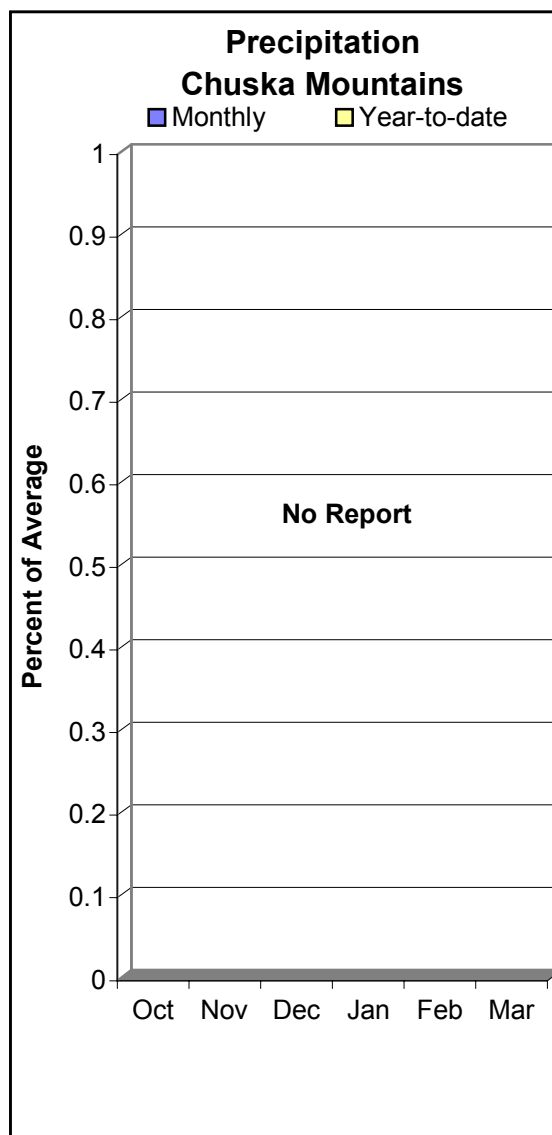
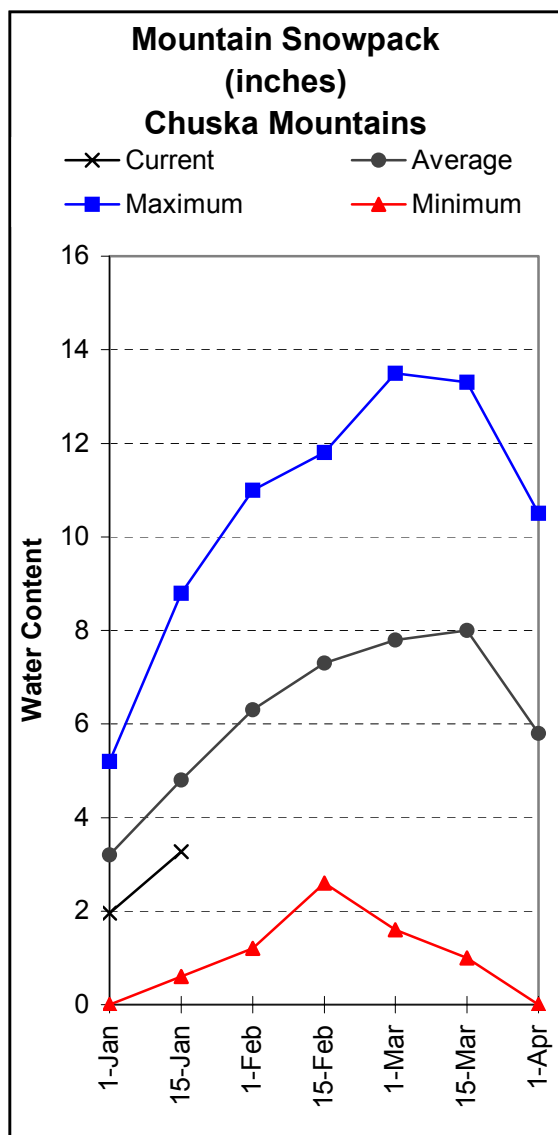
Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
LYMAN RESERVOIR	30.0	2.1	2.1	14.3
SHOW LOW LAKE	5.1	3.1	2.0	2.6

LITTLE COLORADO RIVER BASIN  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Average
LITTLE COLORADO - SOUTHERN H	9	60	35
CENTRAL MOGOLLON RIM	4	80	40

## CHUSKA MOUNTAINS as of January 15, 2004

Snow survey measurements conducted by personnel of the Navajo Tribe show the Chuska snowpack to be 68 % of average, while well below average streamflow levels are forecast for Captain Tom Wash, Wheatfields Creek and Bowl Canyon Creek, through springtime.



CHUSKA MOUNTAINS  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Avg
Period	(1000AF)	(1000AF)	(1000AF) (% AVG.)	(1000AF)	(1000AF)		(1000AF)
Captain Tom Wash nr Two Gray Hills							
MAR-MAY	0.34	0.54	1.25	44	2.55	4.45	2.83
Wheatfields Creek nr Wheatfields							
MAR-MAY	0.35	0.55	1.25	43	2.65	4.55	2.90
Bowl Canyon Creek abv Assayi Lake							
MAR-MAY	0.11	0.18	0.43	43	0.90	1.58	1.00

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

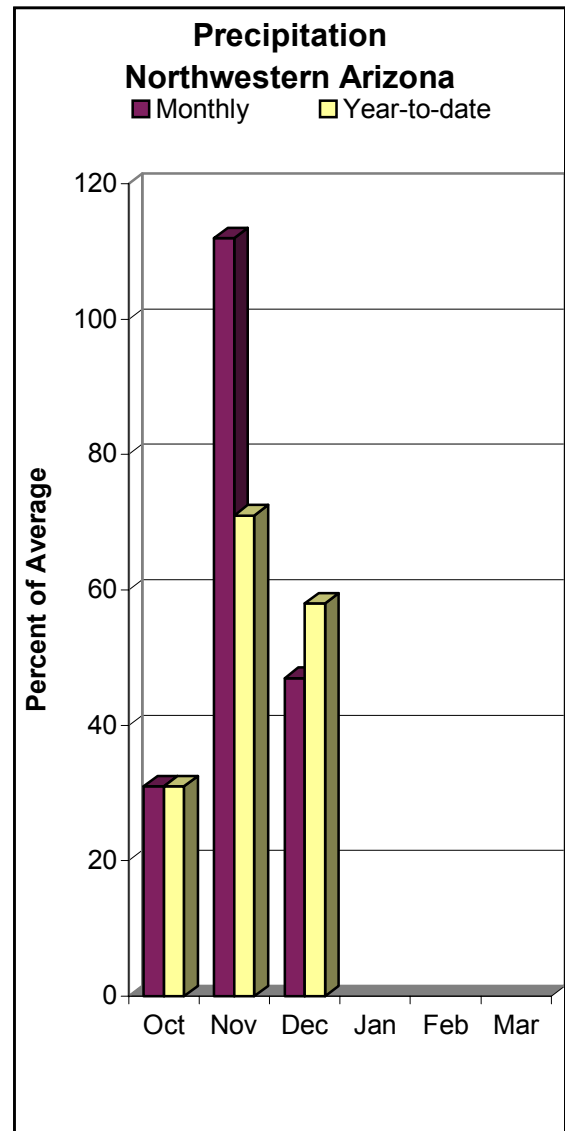
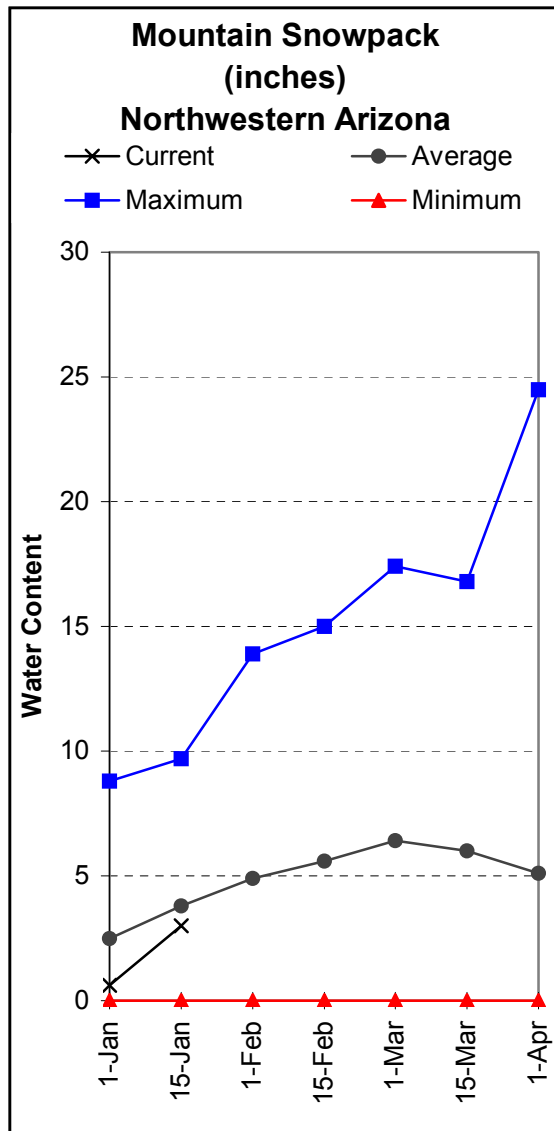
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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

CHUSKA MOUNTAINS  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
CHUSKA MOUNTAINS	7	84	68
DEFIANCE PLATEAU	2	87	68

## NORTHWESTERN ARIZONA as of January 15, 2004

Inflow into Lake Powell, on the Colorado River, is forecast at 86 % of average through JULY, while at the Grand Canyon, snow survey measurements conducted by National Park Service personnel show the snowpack to be 79 % of the 30-year average.





NORTHWESTERN ARIZONA  
Streamflow Forecasts - January 15, 2004

	<=== Drier === Future Conditions === Wetter ===>						
Forecast Pt	Chance of Exceeding *						
Forecast	90%	70%	50% (Most Prob)	30%	10%		30 Yr Avg
Period	(1000AF)	(1000AF)	(1000AF) (% AVG.)	(1000AF)	(1000AF)		(1000AF)
Lake Powell inflow							
APR-JUL	3964	5653	6800	86	7949	9639	7930

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The average is computed for the 1971-2000 base period.

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- (2) - The value is natural volume - actual volume may be affected by upstream water management.

NORTHWESTERN ARIZONA  
Reservoir Storage (1000AF) Mid-January

Reservoir	Usable Capacity	***** This Year	***** Usable Storage Last Year	***** Average
LAKE HAVASU	619.0	510.5	554.9	557.4
LAKE MOHAVE	1810.0	1606.3	1684.7	1657.0
LAKE MEAD	26159.0	15385.0	16802.0	21868.0
LAKE POWELL	24322.0	11236.0	13530.0	18748.0

NORTHWESTERN ARIZONA  
Watershed Snowpack Analysis - January 15, 2004

Watershed	Number of Data Sites	This Year as Percent of Last Year	Percent of Average
GRAND CANYON	2	136	68

# S N O W   S U R V E Y   D A T A

JANUARY 15, 2004

SNOW COURSE	ELEV.	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 71-00
ARBABS FOREST (AK)	7680	1/14	3	1.0	1.6	1.7
BAKER BUTTE SNOTEL	7330	1/15	-	1.3	1.7	3.5
BAKER BUTTE #2	7700	1/15	8	2.6	3.0	6.5
BALDY SNOTEL	9220	1/15	-	1.8	4.0	4.5
BEAVER HEAD	8000	1/14	0	0.0	1.2	2.1
BEAVER HEAD SNOTEL	7990	1/15	-	1.9	3.3	2.5
BEAVER SPRING	9220	1/14	13	3.4	3.8	5.9
BRIGHT ANGEL	8400	1/14	16	4.5	3.3	5.7
BUCK SPRING	7400	1/14	0	0.0	0.9	4.1
CHALENDER	7100	1/14	0	0.0	0.0	2.1
CHEESE SPRINGS	8600	1/15	8	1.4	1.9	3.3
CORONADO TRL SNOTEL	8400	1/15	-	0.7	1.9	2.8
CORONADO TRAIL	8400	1/14	0	0.0	0.8	2.1
FLUTED ROCK	7800	1/15	8	1.6	1.4	2.1
FORT APACHE	9160	1/15	10	1.4	3.8	4.8
FORT VALLEY	7350	1/16	2	0.6	0.0	1.9
FRY SNOTEL	7220	1/15	-	2.2	2.4	4.0
GRAND CANYON	7500	1/15	3	0.8	-	2.1
HANNAGAN MDWS SNOTEL	9020	1/15	-	2.9	4.1	7.0
HAPPY JACK	7630	1/14	2	0.6	1.6	3.0
HAPPY JACK SNOTEL	7630	1/15	-	1.9	3.0	2.9
HEBER SNOTEL	7640	1/15	-	1.5	1.8	3.9
LAKE MARY	6970	1/15	1	0.6	1.9	2.0
MAVERICK FORK SNOTEL	9200	1/15	-	2.0	4.4	5.7
MORMON MTN SNOTEL	7500	1/15	-	1.7	1.6	3.8
MORMON MT. SUMMIT #2	8470	1/15	9	3.1	4.0	6.9
NEWMAN PARK	6750	1/16	1	0.2	0.4	2.1
NUTRIOSO	8500	1/14	0	0.0	0.8	1.4
PROMONTORY SNOTEL	7900	1/15	-	3.1	4.1	7.1
SNOW BOWL #1 ALT.	10260	1/13	13	2.4	2.3	7.4
SNOW BOWL #2	11000	1/13	19	4.2	3.9	10.4
SNOWSLIDE CYN SNTL	9750	1/15	-	8.4	9.9	8.0
TSAILE CANYON #1	8160	1/13	11	2.9	3.2	4.2
TSAILE CANYON #3	8920	1/13	18	4.6	5.5	5.6
WHITE HORSE SNOTEL	7180	1/15	-	1.2	0.9	3.2
WILDCAT SNOTEL	7850	1/15	-	0.8	1.8	2.8
WILLIAMS SKI RUN	7720	1/14	10	2.9	1.3	4.8
WORKMAN CREEK SNOTEL	6900	1/15	-	2.4	2.7	4.3

*Issued by*

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